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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/069,330	05/14/2002	Frits Kornelis Feenstra	310.1027	7852

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EXAMINER	
STAICOVICI, STEFAN	

ART UNIT	PAPER NUMBER
1732	

DATE MAILED: 09/21/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/069,330	FEENSTRA, FRITS KORNELIS	
	Examiner	Art Unit	
	Stefan Staicovici	1732	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *30 May 2002*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-12* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-12* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *5/30/2002*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 2-10 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 4-10 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. In claim 4, the limitation of "wherein measures are taken" without specifying which "measures" is indefinite. A positive recitation of the "measures" taken is required.

Claims 5-10 are rejected as dependent claims.

A broad range or limitation together with a narrow range or limitation that falls within the broad range or limitation (in the same claim) is considered indefinite, since the resulting claim does not clearly set forth the metes and bounds of the patent protection desired. Note the explanation given by the Board of Patent Appeals and Interferences in *Ex parte Wu*, 10 USPQ2d 2031, 2033 (Bd. Pat. App. & Inter. 1989), as to where broad language is followed by "such as" and then narrow language. The Board stated that this can render a claim indefinite by raising a question or doubt as to whether the feature introduced by such language is (a) merely exemplary of the remainder of the claim, and therefore not required, or (b) a required feature of the claims. Note also, for example, the decisions of *Ex parte Steigewald*, 131 USPQ 74 (Bd. App. 1961); *Ex parte Hall*, 83 USPQ 38 (Bd. App. 1948); and *Ex parte Hasche*, 86 USPQ 481

(Bd. App. 1949). In the present instance, claim 2 recites the broad recitation "optical scan technique", and the claim also recites "laser technique" which is the narrower statement of the range/limitation.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 1-7 and 11-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Brodkin *et al.* (US Patent No. 6,322,728 B1) in view of Danforth *et al.* (US Patent No. 5,900,207).

Brodkin *et al.* ('728) teach the basic claimed process of making a dental element using a 3-D printing technique including, spreading a thin layer of ceramic powder over the surface of a mold and according to instructions from a 3-D CAD representation of the dental element and sintering/curing each layer simultaneously (see col. 2, lines 39-53).

Regarding claims 1 and 5, Brodkin *et al.* ('728) does not teach a nanomeric material. Danforth *et al.* ('207) teach the use of ceramic (inorganic) nanomeric material (see col. 6, lines 13-17) in a 3-D CAD freeform process. Therefore, it would have been obvious for one of ordinary skill in the art to have provided a ceramic nanomeric powder material as taught by Danforth *et al.* ('207) in the process of Brodkin *et al.* ('728) because, Danforth *et al.* ('207) specifically teach that such particles are to be used in a 3-D CAD process, whereas Brodkin *et al.*

('728) teach a 3-D printing technique and also because nanomeric particles provide for improved characteristics such as reduced porosity, improved mechanical strength, etc. Further, it is noted that Brodkin *et al.* ('728) teach an organic binder that is polymerizable forming a ceramic-polymer composite (see col. 5, line 64 through col. 6, line 10).

In regard to claims 2-3, Brodkin *et al.* ('728) teach a CAD device which uses at least two inputs: (1) the digital image *taken optically* (laser scanning) (emphasis added) directly from a mouth of the patient (optical impression) or created by digitizing the impression/die by contact or by an optical digitizer; and (2) a library of teeth shapes and forms, hence assuring both natural-like shape and proper function of the resulting dental element (see col. 3,lines 33-45).

Specifically regarding claim 4, Brodkin *et al.* ('728) teach that the binder is spread into selected regions and curing occurs simultaneously in those regions, whereas the other regions are uncured and as such the material is subsequently removed (see col. 3, lines 62-67 and col. 4, lines 45-50).

Regarding claim 6, Brodkin *et al.* ('728) teach a piezo inkjet printer (raster/vector apparatuses) (see col. 3, lines 50-63).

In regard to claim 7, Brodkin *et al.* ('728) teach a polymer matrix including UV curing additives (see col. 6, lines 52-55). Hence, it is submitted that Brodkin *et al.* ('728) teach UV curing.

Specifically regarding claim 11, Danforth *et al.* ('207) teach sanding and grinding of the resulting molded element in order to improve its surface finish. Therefore, it would have been obvious for one of ordinary skill in the art to have used post-operational sanding and grinding as taught by Danforth *et al.* ('207) after making the dental element by the process of Brodkin *et al.*

('728) because, Danforth *et al.* ('207) teach that sanding and grinding improves the surface finish, hence improving aesthetics and obtaining an improved product.

Regarding claim 12, Brodkin *et al.* ('728) teach a dental element.

5. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Brodkin *et al.* (US Patent No. 6,322,728 B1) in view of Danforth *et al.* (US Patent No. 5,900,207) and in further view of Bredt *et al.* (US Patent No. 5,902,441).

Brodkin *et al.* ('728) in view of Danforth *et al.* ('207) teach the basic claimed process as described above.

Regarding claim 8, although Brodkin *et al.* ('728) teach UV curing, Brodkin *et al.* ('728) in view of Danforth *et al.* ('207) do not teach laser curing. Bredt *et al.* ('441) teach a 3-D printing technique using a laser for to fuse particles into a 3-D product (see col. 1, line 63 through col. 2, line 4). Therefore, it would have been obvious for one of ordinary skill in the art to have provided a laser in a 3-D printing technique as taught by Bredt *et al.* ('441) to cure the ceramic-polymer composite in the process of Brodkin *et al.* ('728) in view of Danforth *et al.* ('207) because of well known advantages that laser curing provides such as increased speed, process control, automation and also because, all references teach similar processes.

6. Claims 9-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Brodkin *et al.* (US Patent No. 6,322,728 B1) in view of Danforth *et al.* (US Patent No. 5,900,207) and in further view of WO 98/51747.

Brodkin *et al.* ('728) in view of Danforth *et al.* ('207) teach the basic claimed process as described above.

Regarding claims 9-10, although Brodkin *et al.* ('728) teach secondary curing to further promote binding (see col. 4, lines 43-50), Brodkin *et al.* ('728) in view of Danforth *et al.* ('207) do not teach a specific secondary curing cycle. WO 98/51747 teach a process for forming a nanostructured product including, providing a mold, applying a layer of nanomeric material and curing said nanomeric material (see Abstract). Further, WO 98/51747 teach secondary curing of said nanomeric material in a first curing step at 60-150 °C and then a second post-curing step of heating above 250 °C (see page 2). Therefore, it would have been obvious for one of ordinary skill in the art to have provided a post-curing process of a nanomeric material in a first post-curing step at 60-150 °C and then a second post-curing step of heating above 250 °C as taught by WO 98/51747 in the process of Brodkin *et al.* ('728) in view of Danforth *et al.* ('207) because, Brodkin *et al.* ('728) specifically teach the desirability of post-curing in order to promote binding, hence providing for an improved product and also because post-curing removes voids, delaminations and other defects.

Conclusion

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Stefan Staicovici, Ph.D. whose telephone number is (571) 272-1208. The examiner can normally be reached on Monday-Friday 9:30 AM to 6:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael P. Colaianni, can be reached on (571) 272-1196. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Stefan Staicovici, PhD

Primary Examiner 9/12/04

AU 1732

September 17, 2004